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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------------|------------------|
| 09/550,282 | 04/14/2000 | Sung-II Park | 1607-0211P | 9574 |
| 2292 | 7590 | 12/15/2003 | | |
| BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | EXAMINER QI, ZHI QIANG | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2871 | |

DATE MAILED: 12/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/550,282 | PARK ET AL. | |
| | Examiner | Art Unit | |
| | Mike Qi | 2871 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Aug. 1, 2003 has been entered.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claims 1, 15 and 22, recitation “. . . edges of said gate line being substantially straight and even; . . . edges of said data line being substantially straight and even; . . .” that is indefinite. Because the edges of the gate line and the edges of the data line cannot tell which edges are substantially straight and even, and the edges can be any portion of the gate line and the data line which is straight and even.

The description of the edges for the gate line and the data line cannot be found in the specification.

On the other hand, this application is to solve the problem with the high reflectivity

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from the data line so as to form a low reflective layer on at least a portion of the data line to eliminate the problem with the high reflectivity thereof (see page 4, lines 14-16 of the specification), and that is nothing concerned with the edges of the gate line and the data line.

Claims 2-14, 16-21 and 23-25 are dependent to the claims 1, 15 and 22 respectively. Therefore, all the dependent claims contain the deficiency set forth above.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-2, 11-16 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,100,954 (Kim et al) in view of US 6,172,728 (Hiraishi).**

Claims 1, 15 and 22, Kim discloses (col.1, line 41 – col.5, line 20; Figs.1-6) that a liquid crystal display device comprising:

(concerning claims 1 and 15)

- gate line (15) formed on a transparent substrate (11), the gate line (15) having gate electrodes (13) connected thereto (the gate electrode '13' protruding from the gate line '15'); and a portion protruding from the gate line (15) to serve as a gate electrode (13) of a thin film transistor on a transparent substrate (11); and the edges of the gate line (15) being

substantially straight and even (see Fig.1; and that is the same as this application's Fig.5);

- source line (25) (data lines) crossing the gate line (15) and formed on the transparent substrate (11); and the edges of the data line (25) of the data line (25) being straight and even (see Fig.1; and that is the same as this application's Fig.5);
- gate insulating layer (17) electrically insulating the data line (25) and the gate line (15) (see Fig.6);
- thin film transistor (TFT) formed at an intersection of the gate line (15) and the data line (25), and connected to the gate line (15) and the data line (25);
- a protection film (29) provided by insulating material such as silicon nitride (SiNx) (functions as a passivation layer) formed over the TFT;
- pixel electrode (31) formed on the surface of the protection film (29) (functions as a passivation layer);

(concerning claim 22)

- forming a gate line (15) and gate electrode (13) connected thereto on a transparent substrate (11), and edges of the gate line (15) being substantially straight and even (see Fig.1; and that is the same as this application's Fig.5);
- forming gate insulating film (17) over the gate line (15) and the gate electrode (13) (see Figs.6, 2F);

- forming a semiconductor layer (19) over the gate electrode (13);
- forming a data line (25) crossing the gate line (15), and the edges of the data line (25) being straight and even (see Fig.1; and that is the same as this application's Fig.5); and a source electrode (23) connected to the data line (25) and on a first portion (such as left portion) of the semiconductor layer (19), and a drain electrode (27) on second portion (such as right portion) of the semiconductor layer (19);
- forming protection insulating film (29) (functions as a passivation layer) having a contact hole exposing the drain electrode (27) over the transparent substrate (11);
- forming pixel electrode (31) on the protection insulating film (29) (functions as a passivation layer) and connected to the drain electrode (27) via the contact hole.

Kim does not expressly disclose that a low reflective layer formed on at least a portion of the gate line or the data line.

However, Hiraishi discloses (col.6, lines 34-37; Fig.1) that by providing a low-reflective film preferably made of chromium oxide (CrOx) on the gate lines (2) and the source lines (3) (data line), the display quality is enhanced.

Since a low reflective film formed on the gate lines and the data lines would enhance the display quality as Hiraishi taught.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to form a low reflective layer on at least a portion of the data line or the gate line as claimed in claims 1, 15 and 22 for enhancing the display quality.

Claims 2 and 16, Hiraishi discloses (col.6, lines 34-37; Fig.1) that by providing a low-reflective film preferably made of chromium oxide (CrOx) on the gate lines (2) and the source lines (3) (data line), the display quality is enhanced. Therefore, it would have been obvious to those skilled in the art at the time the invention was made to form a low reflective layer on at least a portion of the gate line as claimed in claims 2 and 16 for enhancing the display quality.

Claims 11, Hiraishi discloses (col.5, lines 8 –11; col.6, lines 43-44; Fig.2) that an interlayer insulating film (8) (functions as a passivation layer) is formed entirely over the TFT (1), the gate line (2) and the source line (3) (data line), and a pixel electrode (4) is formed on the interlayer insulating film (8) (functions as a passivation layer) and connecting with the drain electrode (14) via contact hole (9a) in the interlayer insulating film (8) (functions as a passivation layer). Hiraishi indicated (col.6, lines 34-37) providing a low-reflective film on the gate lines (2) and the data lines (3), so that the interlayer insulating film (8) (functions as a passivation layer) is also formed over the low-reflective film, and that would enhancing the display quality. Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a low reflective layer as claimed in claim 11 for enhancing the display quality.

Claims 12-13, 23-24, Hiraishi discloses (col.5, lines 56-57; Fig.1) that the pixel electrode (4) is formed over a portion of the data line (3) and over a portion of the gate

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line (2), and the unnecessary leakage of light to the gap between the pixel electrodes and the gate lines or the data lines is prevented. Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the pixel electrode over a portion of the gate line or the data line as claimed in claims 12-13, 23-24 for preventing the unnecessary light leakage.

Claims 14 and 25, Hiraishi discloses (col.7, lines 13 – 24) that color film is provided on the counter substrate (20) (color filter substrate) is desired; and a liquid crystal material (30) sealed between the color filter substrate (20) and the transparent substrate (10), such that to display a color image. Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use color filter as claimed in claims 14 and 25 for achieving a color image display.

3. Claims 3-4, 6-8, 10, 17-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim and Hiraishi as applied to claims 1-2, 11-16 and 22-25 above, and further in view of US 6,503,772 (Ohtsu et al) and US 6,259,200 (Morita et al).

Claims 3-4, 6-8, 10, 17-19 and 21, Hiraishi discloses (col.6, lines 13 – 37; Fig.2) that the thin film transistor (TFT1) includes a gate electrode (12), a source electrode (13) and a drain electrode (14), and a gate electrode (12) protruding from the gate line (2) (see Fig.2, same as the source/drain electrodes, a source electrode (13) protruding from the data line (3)), so that the gate electrode (12) is connected to the gate line (2) and the source electrode is connected to the data line (3). Hiraishi indicates (col.6, lines 34-37; Fig.1) that by providing a low-reflective film preferably made of chromium oxide

(CrOx) on the gate lines (2) (the gate electrode is connected to the gate line) and the source lines (3) (data line) (the source electrode is connected to the data line), the display quality is enhanced. Therefore, forming a low reflective layer on the gate electrode and on the source/drain electrodes to enhance the display quality would have been at least an obvious variation.

Further, Ohtsu discloses (col.4, lines 36-42) that by forming the electrode with a low reflectance material, the electrodes and the electrode line can be provided with the same function as the black matrix, so that means forming low reflective layer on the electrodes (gate electrode or source/drain electrode) would improve the contrast as the function of the black matrix.

Further, Morita also discloses the same principle (col.4, lines 51-67) that the top layer of the signal line (such as the material of Al or Ag) will cause its reflectance to be large enough to degrade the quality of image, such that for this reason, a top layer of a material (such as Cr) having a relatively low reflectance is further applied in the Al film to preclude unwanted light reflection, that means would improve the quality of the image display.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to form a low reflective layer on the gate electrode and on the source/drain electrodes as claimed in claims 3-4, 6-8, 10, 17-19 and 21 for enhancing the display quality.

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4. **Claims 5, 9 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim, Hiraishi, Ohtsu and Morita as applied to claims 1-4, 6-8, 10-19 and 21-25 above, and further in view of Applicant admitted prior art (AAPA)**

Claims 5, 9 and 20, AAPA discloses (page 4, lines 2-3 of the specification) that the reflectivity of CrOx is about 3%, and that is the property of a material. Using CrOx as the low-reflective layer, the material CrOx must have such reflectivity, and that would have been at least obvious.

Response to Arguments

5. Applicant's arguments filed on Aug.1, 2003 have been fully considered but they are not persuasive.

Applicant's **only** arguments are as follows:

1) The reference Hiraishi teaches away from edges of the gate line or data line being substantially straight and even in which the scanning lines or signal lines have bends, notches, protrusions and holes with uneven surfaces (particularly edge surfaces) as seen in all of the figures. Accordingly, Hiraishi teaches away from Applicant's claimed invention as claimed in the claims 1, 15 and 22.

Examiner's responses to Applicant's **only** arguments are as follows:

1) The conventional LCD structure such as the references Kim or AAPA (see the Fig.1 of Kim and the Fig.1 of AAPA) having the gate lines and the data line wherein the edges of the gate lines and the data lines being straight and even.

The important inventive characteristics are a low reflective layer formed on the data line to eliminate the problems with the high reflectivity of the data lines. Applicant indicates in the specification (page 4, lines 14-16 and page 5, lines 5-8) that a low reflective layer is formed on at least a portion of the data line to eliminate problems with the high reflectivity thereof, and the present invention does not require a black matrix, because the low reflective layer eliminates the need for a black matrix. However, the reference Hiraishi teaches (col.6, lines 34-37; Fig.1) that by providing a low-reflective film preferably made of chromium oxide (CrOx) on the gate lines (2) and the source lines (3) (data line), the display quality is enhanced. Therefore, it would have been obvious to those skilled in the art at the time the invention was made to form a low reflective layer on at least a portion of the data line or the gate line as claimed in claims 1, 15 and 22 for enhancing the display quality.

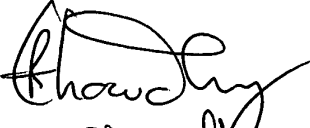
Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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7. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mike Qi
December 8, 2003


T. Chowdhury
Primary Examiner